

CLAIMS

1. In a magnetic disk drive, a method of bonding lubricant to a surface of a magnetic disk comprising:
- 5 providing a heat source at an air bearing surface (ABS) of a magnetic head;
causing the heat source to be energized to produce heat; and
causing the magnetic head to be moved across a surface portion of a magnetic disk so that lubricant is thermally bonded to the surface portion from the heat produced by the heat source.
- 10 2. The method of claim 1, wherein the heat source comprises one or more pole pieces of the magnetic head.
3. The method of claim 1, wherein the heat source comprises one or more pole pieces of the magnetic head to which electrical conductors are coupled to drive an electrical current therethrough.
- 15 4. The method of claim 1, wherein the heat source comprises one or more pole pieces of the magnetic head and wherein a heater driver circuit is provided for driving an electrical current through the one or more pole pieces.
- 20 5. The method of claim 1, further comprising:
repeating, on a regular basis, the acts of causing the heat source to be energized and the magnetic head to be moved across the surface portion of the magnetic disk.
- 25 6. The method of claim 1, further comprising:
performing the acts of causing based on identifying an expiration of a predetermined time period.

7. The method of claim 1, further comprising:
performing the acts of causing based on identifying a predetermined ambient
condition.

5 8. The method of claim 1, wherein the surface portion comprises an inner
diameter (ID) or outer diameter (OD) of the magnetic disk.

9. The method of claim 1, further comprising:
providing a lubricant reservoir in the disk drive which provides the lubricant on
10 the surface of the magnetic disk.

10. A magnetic head assembly, comprising:
a magnetic head;
a lubricant bonding heat source at an air bearing surface (ABS) of the magnetic
15 head; and
the lubricant bonding heat source being operative to heat a surface portion of a
magnetic disk to thermally bond lubricant to the surface portion of the magnetic disk.

11. The magnetic head assembly of claim 10, wherein the lubricant bonding
20 heat source comprises first and second pole pieces of the magnetic head.

12. The magnetic head assembly of claim 10, further comprising;
wherein the lubricant bonding heat source comprises first and/or second pole
pieces of the magnetic head; and
25 electrical conductors coupled to the first and/or second pole pieces for driving
either an alternating current (AC) or direct current (DC) through the first and/or second
pole pieces.

13. The magnetic head assembly of claim 10, further comprising:

wherein the lubricant bonding heat source comprises first and/or second pole pieces of the magnetic head;

a heater driver circuit coupled to the first and/or second pole pieces through electrical conductors for driving an electrical current through the first and/or second pole pieces.

14. The magnetic head assembly of claim 10, wherein the lubricant bonding heat source is energized on a regular basis in a lubricant bonding mode of operation.

10 15. A disk drive, comprising:
a housing;
a magnetic disk rotatably supported in the housing;
a magnetic head assembly which includes a magnetic head;
a support mounted in the housing which supports the magnetic head assembly so
15 as to be in a transducing relationship with the magnetic disk;
a spindle motor which rotates the magnetic disk;
an actuator positioning device connected to the support which moves the magnetic head assembly to multiple positions with respect to the magnetic disk;
a processor connected to the magnetic head assembly and to the actuator;
20 the processor being operative to exchange signals with and control the position of the magnetic head assembly;
a lubricant bonding heat source carried on the magnetic head assembly;
a driver circuit coupled to the lubricant bonding heat source;
the disk drive having a read/write mode of operation during which data is read
25 from/written to the magnetic disk;
the disk drive having a lubricant bonding mode of operation during which:
the driver circuit is operative to cause the lubricant bonding heat source to be heated; and

the processor is operative to control the position of the magnetic head assembly so the lubricant bonding heat source heats a surface portion of the magnetic disk so that lubricant is bonded to the surface portion.

5 16. The disk drive of claim 15, further comprising:
first and second pole pieces of the magnetic head; and
wherein the lubricant bonding heat source comprises the first and/or second pole
pieces of the magnetic head.

10 17. The disk drive of claim 15, further comprising:
first and second pole pieces of the magnetic head;
wherein the lubricant bonding heat source comprises the first and/or second pole
pieces of the magnetic head; and
wherein the driver circuit is coupled to the first and/or second pole pieces through
15 electrical conductors for driving an electrical current through the first and/or second pole
pieces.

 18. The disk drive of the claim 15, further comprising:
first and second pole pieces of the magnetic head;
20 wherein the lubricant bonding heat source comprises the first pole piece of the
magnetic head; and
wherein the driver circuit is coupled to the first pole piece through electrical
conductors for driving an electrical current through the first pole piece.

25 19. The disk drive of claim 15, further comprising:
a lubricant reservoir which provides the lubricant on the surface of the magnetic
disk.

20. The disk drive of claim 15, wherein the lubricant bonding mode of operation and the read/write mode of operation are mutually exclusive modes of operation.

5 21. The disk drive of claim 15, wherein the processor is operative to activate the lubricant mode of operation of the disk drive on a regular basis.

22. The disk drive of claim 15, further comprising:
an environmental condition sensor; and
10 wherein the processor is operative to activate the lubricant mode of operation of the disk drive based on signals from the environmental condition sensor.

23. A computer program product, comprising:
a data storage medium;
15 computer instructions stored in the data storage medium; and
the computer instructions being executable on a processor for:
causing a heat source at an air bearing surface (ABS) of a magnetic head
to be energized to produce heat; and
causing the magnetic head to be moved across a surface portion of a
20 magnetic disk so that lubricant is thermally bonded to the surface portion from the heat produced by the heat source.

24. The computer program product of claim 23, wherein the computer instructions are further executable for repeating, on a regular basis, the acts of causing the
25 heat source to be energized and the magnetic head to be moved across the surface portion of the magnetic disk.

25. The computer program product of claim 23, wherein the computer instructions are further executable for repeating, on a periodic basis, the acts of causing

the heat source to be energized and the magnetic head to be moved across the surface portion of the magnetic disk.

5 26. The computer program product of claim 23, wherein the computer instructions are further executable for performing the acts of causing based on identifying an expiration of a predetermined time period.

10 27. The computer program product of claim 23, wherein the computer instructions are further executable for performing the acts of causing based on identifying a predetermined environmental condition.

15 28. The computer program product of claim 23, wherein the computer instructions are further executable for performing the acts of causing based on identifying a predetermined temperature condition.

29. The computer program product of claim 23, wherein the computer instructions are further executable for performing the acts of causing based on identifying a predetermined humidity condition.

20 30. The computer program product of claim 23, wherein the computer instructions are further executable for performing the acts of causing in response to a signal.